with a means for injection of O-containing gas toward the end of the nozzle for removing carbon deposit from the nozzle end, meanwhile suppressing carbon formation on the wall of oven.

03/02472 Apparatus and method for incinerator flue gas treatment

Yokoyama, T Jpn. Kokai Tokkyo Koho JP 2003 93,839 (Cl. B01D53/70), 2 Apr 2003, Appl. 2001/330,001. (In Japanese)
The apparatus comprises means for passing flue gases through a fixed bed of filtering materials made of crushed wood chips or waste plastics, means for monitoring the pressure loss of the fixed filter bed by a deferential pressure sensor at its outlet side, and means for recovering the used filtering materials and then utilizing it as supplementary fuel for the incinerator. The apparatus is effective for removing dioxin and fly dust from flue gases and eliminates the use of bag filters.

03/02473 Catalytic removal of SO_2, NO and HCl from incineration flue gas over activated carbon-supported metal oxides

Tseng, H.-H. *et al. Carbon*, 2003, 41, (5), 1079–1085.
Activated carbon-supported copper, iron, or vanadium oxide catalysts were exposed to incineration flue gas to investigate the simultaneous catalytic oxidation of sulfur dioxide/hydrogen chloride and selective catalytic reduction of nitrogen oxide by carbon monoxide. The results show that AC-supported catalysts exhibit higher activities for SO_2 and HCl oxidation than traditional γ-Al_2O_3-supported catalysts and the iron and vanadium catalysts act as catalysts instead of sorbents, and can decompose sulfate with evolution of SO_3 and then regenerate for more SO_2 adsorption to take place. The AC-supported catalysts also display a high activity for NO reduction with CO generated from a flue gas incineration process and the presence of SO_2 in the incineration flue gas can significantly promote catalytic activity. Using CO as the reducing agent for NO reduction is more effective than using NH_3, because NH_3 may be partially oxidized in the presence of excess O_2 (12 vol% in the incineration flue gas used) to form N_2, which can decrease the overall extent of NO reduction.

03/02474 Combustion engine using reforming gas by utilizing reformer with steam reforming

Numao, Y. *et al.* Jpn. Kokai Tokkyo Koho JP 2003 97,355 (Cl. F02M21/02), 3 Apr 2003, Appl. 2001/285,376. (In Japanese)
The combustion engine includes a reformer arranged in the exhaust passage to obtain reforming gas by steam reforming hydrocarbon fuel (e.g. gasoline), a first valve arranged inlet side of the water jacket for control of flow rate, a second valve arranged outlet side for switching the passage, and a gasifier connecting to the second valve to generate steam, by control of flow rate of water using the first valve at low load, to evaporate water inside the jacket to be steam for supplying to the gasifier via the second valve as supplementary steam for reformer.

03/02475 Combustion of fuel with lime water and apparatus therefor

Aiura, M. Jpn. Kokai Tokkyo Koho JP 2003 83,508 (Cl. F23C11/00), 19 Mar 2003, Appl. 2001/276,495. (In Japanese)
A mixture of fuel and lime water is combusted in a reaction chamber under a high temperature and a high pressure and S component and/or F component present in the fuel is discharged as a gypsum or fluorite powder from the reaction chamber together with the combustion gas. The fuel is preferably heavy oil or finely powdered coal. A dust collector can be connected to the reaction chamber for collection of gypsum or fluorite powder.

03/02476 Combustion of poultry litter in a fluidised bed combustor

Abelha, P. *et al. Fuel*, 2003, 82, (6), 687–692.
Combustion studies of poultry litter alone or mixed with peat by 50% on weight basis were undertaken in an atmospheric bubbling fluidized bed. Because of high moisture content of poultry litter, there was some uncertainty whether the combustion could be sustained on 100% poultry litter and as peat is very available in Ireland; its presence was considered to help to improve the combustion. However, the results showed that, as long as the moisture content of poultry litter was kept below 25%, the combustion did not need the addition of peat. The main parameters that were investigated are (i) moisture content, (ii) air staging, and (iii) variations in excess air levels along the freeboard. The main conclusions of the results are (i) combustion was influenced very much by the conditions of the fuel supply, (ii) the steady fuel supply was strongly dependent on the moisture content of the poultry litter, (iii) temperature appeared to be still very influential in reducing the levels of unburned carbon and hydrocarbons released from residues, (iv) the air staging in the freeboard improved combustion efficiency by enhancing the combustion of volatiles released from residues in the riser and (vi) NO_x emissions were influenced by air staging in the freeboard. Particles collected from the bed and the two cyclones were analysed to determine the levels of heavy metals and the leachability tests were carried out with ashes collected to verify whether or not they could safely be used in agricultural lands.

03/02477 Corrosion of low pressure heated water boiler and its prevention

Wang, F.-U. *Heilongjiang Dianli*, 2002, 24, (4), 305–307. (In Chinese)
The acid corrosion of low temperature heated surface of coal-fired boiler and the fire side corrosion of boiler water pipes are analysed.

03/02478 Device for slag removal from furnace of gasification apparatus

Ito, K. *et al.* Jpn. Kokai Tokkyo Koho JP 2003 82,362 (Cl. C10J3/00), 19 Mar 2002, Appl. 2001/282,019.
Device for slag removal from the furnace of a gasification apparatus comprises and injection nozzle inserted into the furnace, a bearing movably supporting the injection nozzle, means for supplying drive gas into the space inside the device in order to move pneumatically the nozzle into the furnace and out of the furnace, and means for supplying gas to the nozzle. The flow rate of the drive gas is controlled so as to be below the preset value. Damage of sliding surface of the injection nozzle is prevented.

03/02479 Effect of fuel type on the fireside corrosion of boiler materials for advanced clean coal technologies

Pinder, L. W. and Davis, C. J. *Schriften des Forschungszentrums Juelich, Reihe Energietechnik/Energy Technology*, 2002, 21, (Pt. 2), 893–902.
In order to meet the demands for future high efficiency coal fired plant in the 21st century, significant increases in the currently employed operating pressures and temperatures will be required. Temperature increases in particular have important implications in terms of materials properties. One important aspect is the fireside corrosion response of the materials. Furnace wall tubes may be expected to operate at metal temperatures approaching 550°C, while superheater and reheater materials may be required to operate at metal temperatures in excess of 700°C. This program is examining furnace wall conditions using short-term exposures (50 h) in a 1 MW_{TH} Combustion Test Facility, and superheater/reheater conditions by conducting long-term exposures in a 500MW pulverized coal fired boiler. Furnace wall fireside corrosion testing in examining the influence of metal temperature, combustion environment, coal chemical and alloy composition. Five candidate furnace wall alloys, with chromium content varying from 0 to 12%, together with high chromium metallic coatings, are being exposed to both oxidizing and reducing environments, while burning three different UK coals. Results to date show that increasing chromium content offers improved corrosion resistance, and that reducing conditions are more aggressive than oxidizing conditions. Dependant upon the coal chemical, the relationship between metal temperature and corrosion rate is not always simple, with pronounced peaks in wastage rates at intermediate temperatures being observed. Where peaks in wastage rate occur, all alloys and the normally highly protective high chromium sprayed coatings are seen to suffer unacceptably high wastage rates. Prolonged exposures are required to accurately reproduce the conditions that are experienced in coal fired superheater/reheater stages, particularly when examining corrosion resistant high alloy materials. Three corrosion probes, each comprising 19 separate specimens of eight candidate superheater alloys are undergoing exposure for several thousand hours within a 500 MW, pulverized coal fired power station boiler. The alloys range from typical 300 series austenitic stainless steels (18%Cr) to 50% Cr containing IN671. The temperature profile along the corrosion probes permits a range of metal temperatures to be examined for each alloy. The probes are being exposed at two separate positions within the boiler to provide information on heat flux effects. A range of open cast and deep mined bituminous United Kingdom coals are burnt in the boiler, reflecting the types of coal routinely delivered to United Kingdom power stations. These exposures are planned to continue until late 2002/early 2003.

03/02480 Electric calcining furnace

Aune, J. A. *et al.* PCT Int. Appl. WO 03 27,012 (Cl. C01B31/04), 3 Apr 2003, NO Appl. 2001/4,708.
The invention relates to an electric calcining furnace for the calcination of solid particulate materials, particularly carbon materials. The furnace comprises a substantially cylinder-shaped, vertical furnace having for supply of material to be calcined to the top of the furnace and means for withdrawing calcined material from the bottom of the furnace. The furnace has a horizontally arranged heating zone with a plurality of substantially horizontal electrodes arranged about the periphery of the cylinder-shaped furnace which electrodes are connected to an electric power source and a control unit for control of the power supply where the control unit is such arranged that electrical current alternates between to two and two electrodes while the other electrodes at the same time carries no electrical current.